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UNIQUE NESTING BEHAVIOR BY TRUMPETER SWANS (CYGNUS BUCCINATOR)

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UNIQUE NESTING BEHAVIOR BY TRUMPETER SWANS (*CYGNUS BUCCINATOR*) —Nesting behavior by Trumpeter swans (*Cygnus buccinator*) has been well documented for most populations. Both sexes cooperate in nest construction, which takes 11–35 days to complete (Hansen et al. 1971, Cooper 1979). Nests generally range from 1.5–3.6 meters in diameter and 1.5 meters in height and are typically built on solid structures such as a muskrat *(Ondatra zibethicus)* house or an island (Hansen et al. 1971, Cooper 1979). However, we discovered an atypical Trumpeter swan nest built of cattail *(Typha angustifolia L.)* located on Vaughn Lake, in Cherry County, Nebraska on 13 May 2016.

We monitored the atypical nest by placing a Nikon D7000 camera, with a 35mm wide-angle lens, approximately 5 meters away on 18 May 2016 at 1800 hours (day 0 of camera placement). The camera was scheduled to take a photo every 5 minutes during daylight hours. We marked all eggs (n = 5) and aged three of the five eggs by floating (Rohwer and Eisenhauer 1989) and concluded they had been incubated for approximately 25 to 30 days. Therefore, the eggs were due to hatch in 2–11 days because Trumpeter swans typically incubate for 32–37 days (Banko 1960). We noticed the nest structure was unstable, free floating, and shorter than most Trumpeter swan nest structures that we have encountered throughout the Sandhills region of Nebraska.

From placement of the camera on day zero to day 3, approximately 50 hours of time-lapse photography, we observed a nest loss event of the Trumpeter swan nest on Vaughn Lake. The time-lapse photography documented the pair attempting to rescue the nest as it rapidly sank. On camera day one (19 May 2016), approximately 20 hours post camera placement, the pair of Trumpeter swans started working together where both adults were simultaneously pulling vegetative material from under the water to rebuild the nest (Fig. 1). Over the next day and a half, we repeatedly observed the swans adding material to the nest followed by a series of images where the nest appeared to be lower in the water and disintegrating and required subsequent rebuilding throughout camera day 2 (20 May 2016). Throughout this event, photographic images showed the female incubating the eggs for 5–10 minute periods (1–2 sequential images), but then she was pictured rebuilding the nest. In the last image before the camera ceased taking images at dark, it appeared that the nest was close to completely collapsing and being inundated. It is unknown the exact time when the nest completely sunk, but by first light the next morning (camera day 3) when the camera turned back on, the nest was no longer there and the female was resting near where the nest had once been. In the first image on camera day 3, it was still raining and overcast from the storm the previous night. Upon arrival to Vaughn Lake on 23 May 2016, we observed the eggs floating in the water near the original nest site.

During the five days between camera placement and the first physical nest check on 23 May 2016, there were multiple days of high winds and a severe thunderstorm the night of 20 May 2016. Upon review, the time-lapse photography showed high winds and choppy water conditions that resulted in the loss of the nest only 3 days after we placed the camera. Weather reports confirmed that on 20 May 2016 there was approximately 3 cm of precipitation with winds reaching 57.4 km/h, which likely contributed to the nest loss event (Weathersource https://weathersource.com/ Accessed 11 November 2016). The Trumpeter swan pair attempted to reconstruct the nest during stages of poor weather conditions by building up the nest with additional vegetation. The pair was likely unsuccessful due to the characteristics of the original nest structure combined with adverse weather. Because the nest was poorly constructed, it allowed us to witness a behavior that would usually not occurr.

There are some obscure remarks within published literature that some waterfowl appear to build up nests to compensate for rising water levels (Wolf 1955), but nest preservation behavior by Trumpeter swans has not been previously documented. Nest preservation behavior for the pair of Trumpeter swans was likely due to the late stage of the incubation period. Bourgeon et al. (2006) observed that nest abandonment in Common Eiders (*Somateria mollissima*) was less likely to occur during the later stages of nest incubation. There can be negative effects while the pair was attempting to rebuild the nest by exposing it to predation or over cooling of the eggs. High recess frequency and extended time off the nest reduced hatch rates of trumpeter swans in Idaho (W. Snyder, Western Oregon University, unpublished data). Although the pair was unsuccessful in saving the nest from loss, this example provides information regarding previously undocumented behavior in Trumpeter swans.

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Figure 1. Time-lapse photograph of the Trumpeter swan pair attempting to rebuild the nest that was sinking on Vaughn Lake in the Nebraska Sandhills (photo provided by Michael Forsberg and the Platte Basin Timelapse Project). See full time-lapse footage at http://plattebasintimelapse.com/notebook/2017/11/trumpeter-swan-nesting-behavior/.

LITERATURE CITED

Baldassarre, G. A. 2014. Ducks, geese, and swans of North America. John Hopkins University Press, Baltimore, Maryland, USA.

Banko, W. E. 1960. The trumpeter swan. North American Fauna Number 63. U.S. Fish and Wildlife Service. Washington D.C., USA. 214 pp.

Bourgeon, S., F. Criscuolo, F. Bertile, T. Raclot, W. G. Gabrielsen and S. Massemin. 2006. Effects of clutch sizes and incubation state on nest desertion in the female common eider *Somateria mollissima* nesting in the high arctic. Polar Biology 29:358–363.

Cooper, J. A. 1979. Trumpeter swan nesting behaviour. Wildfowl 30:55–71.

Hansen, H. A., P. E. K. Shepherd, J. G. King, and W. A. Troyer. 1971. The trumpeter swan in Alaska. Wildlife Monographs 26:3–83.

Matteson, S., S. Craven, and D. Compton. 1995. The trumpeter swan. Publication Number G3647. University of Wisconsin–Extension, Madison, WI, USA.

Mitchell, C. D., and M. W. Eichholz. 2010. Trumpeter swan *(Cygnus buccinator)*. A. Pool, editor. The Birds of North America online. Cornell Lab of Ornithology Online, Ithaca, NY, USA. <http://birdsna.org\Species-Account\BNA\species\truswa\>. Accessed 1 March 2017.

Rohwer, F. C., and D. I. Eisenhauer. 1989. Egg mass and clutch size relationships in geese, eiders, and swans. Ornis Scandinavica 20:43–48.

Wolf, K. 1955. Effects of fluctuating and falling water levels on waterfowl production. Journal of Wildlife Management 19:13–23.

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